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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/735,826	12/13/2000	Lary R. Larson	P-8003	4912

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EXAMINER

UMEZ ERONINI, LYNETTE T

ART UNIT

PAPER NUMBER

1765

DATE MAILED: 07/23/2002

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	09/735,826		LARSON, LARY R.	
	Examiner		Art Unit	
	Lynette T. Umez-Eronini		1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
 If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
 * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
 a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>2</u> . | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

2. Claims 1, 2, 4, 6-9, and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Gnadinger (US 5,229,647).

Gnadinger teaches a method of forming a stackable wafer. The method comprises using two wafers. The following describes the use of one wafer.

forming an opening (vertical through-holes **21**) through the wafer (column3, lines 41-43);

extending metal bumps (conductive material) **20** through the wafers **10** by vertical through-holes (column 3, lines 39-42), which read on depositing conductive material within the opening to substantially fill the opening;

Figure 4 shows bump **20** on the upper surface of the wafer adjacent to the conductive material and a pad **22** (same as applicant's contact pad) on the lower surface of the wafer adjacent the conductive material.

Gnadinger differs in failing to teach forming a stable wafer in an implantable device.

Since Gnadinger uses the same step and materials as those of the claimed invention then it would be inherent that using Gnadinger method of forming a stable wafer would result in forming a stackable wafer in an implantable device.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gnadinger ('647) as applied to claim 1 above, and further in view of Akram (US 5,808,360) and Armacost et al. (US 5,545,581).

Gnadinger differs in failing to teach depositing conductive material within the opening further comprises depositing at least one of copper, tungsten, nickel, and aluminum with the opening.

Akram teaches filling opening with suitable metals include copper, nickel, gold and palladium (column 4, lines 59-60) and an interconnect can provide a permanent electrical connection in the fabrication of electronic devices (column 2, lines 58-61).

It would have been obvious to one having ordinary skill in the art the time of the claimed invention to modify Gnadinger's conductive material by using a suitable metal, for example, copper and nickel as taught by Akram for the purpose of providing a permanent electrical connection in the fabrication of electronic devices.

Gnadinger in view of Akram differs in failing to teach removing a portion of the layer of conductive material further comprises performing a chemical mechanical

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polishing of the layer of conductive material to remove a portion of the layer of conductive material overlying the upper surface of the wafer.

Armacost teaches removing excess metal by using chemical polishing (column 6, lines 55-60).

It would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Gnadinger in view of Akram by employing chemical mechanical polishing to remove a conductive layer as taught by Armacost for the purpose of removing excess metal.

5. Claims 11-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gnadinger ('647) and further in view of Akram (US 5,808,360).

Gnadinger differs in failing to teach position the first wafer adjacent the second wafer with the bump of the first wafer being adjacent the contact pad of the second wafer; and coupling the bump of the first wafer with the contact pad of the second wafer, in claim 11.

Akram illustrates the interaction between microbump (same as applicant bump) **30** (or **30A**) and bond pads (same as applicant's contact pad) **38** on the die **36** and further teaches permanent electrical connection of the microbump **30** (or **30A**) and bond pad **38** (column 6, lines 21-29) and improving the method for forming a microbump interconnect comprising a substrate with conductor and low resistance microbumps formed thereon using semiconductor circuit fabrication techniques (column 1, lines 63-67).


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It would have been obvious to one having ordinary skill in the art at the time of the claimed invention to modify Gnadinger by using Akram's method of position and coupling the bump of the first wafer with the contact pad of the second wafer for the purpose of improving the method for forming a microbump interconnect comprising a substrate with conductor and low resistance microbumps formed thereon using semiconductor circuit fabrication techniques.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 703-306-9074. The examiner can normally be reached on Second Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on 703-308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are 703-972-9310 for regular communications and 703-972-9311 for After Final communications.

ltue
July 15, 2002


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